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DURATION OF VACCINE IMMUNITY IN PERSONS INOCULATED WITH THE LIVE
TULAREMIA VACCINE

[Following is the translation of an article by G. P. Uglovoy, Gamaleya Institute of Epidemiology and Microbiology, AMN USSR, Moscow, published in the Russian-language periodical Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (Journal of Microbiology, Epidemiology, and Immunobiology), No 3, 1967, pp 87-89. It was submitted on 27 May 1965.]

On the basis of data from the literature and our observations of many years it has been established that in persons inoculated with the live tularemia vaccine an intense and lengthy immunity is created which protects them from tularemia infection in the usual ways.

Carrying out of inoculations on large scales made it possible to reduce tularemia incidence in the USSR sharply. If tularemia incidence in the Soviet Union for the 7 years (1942-1948) prior to mass vaccination is accepted as summarily original, then it turns out that as a result of vaccination in the first seven-year plan (1949-1955) incidence was reduced by 7 times, and in the second (1956-1962) - by 35 times.

If inoculations with full-value preparations are carried out correctly then immunity to tularemia in inoculated persons is revealed (by setting up the allergic test with tularin) in 5-6 years after vaccination in 75-90% (Sil'chenko, 1953; Uglovoy, 1953; Vorodin, 1958), in 7 years in 75% (Votyakov et al., 1960), and in 8 years in 58-83% (Uglovoy, 1960; Sil'chenko, 1960).

While working as part of an expedition (headed by N. G. Olsufyev) we supervised and participated in the mass vaccination of the population against tularemia in the former Serpukhovskiy Rayon (1948-1949). Inoculations were carried out with the live dried NIIEG tularemia vaccine, the survival rate of which was 98.3%.

Subsequently we systematically observed the preservation of immunity against tularemia in inoculated persons with a positive cutaneous inoculative reaction.

The dynamics of fading of immunity in inoculated persons are presented in Fig. 1, in which it is seen that 8 years after vaccination 58.3% reacted to tularin. During a check in this period we established that in revaccinated (supervaccinated) persons immunity was preserved longer than in vaccinated persons. Out of

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48 men who had been checked with cutaneous tularin, and who had been subjected to vaccination and a year later revaccination, a positive reaction to tularin was noted in 41, i. e., in 85.5% of the cases. For a comparison there were 76 men who were vaccinated simultaneously with the previous group and who lived in the same territory, but were not subjected to revaccination. During a simultaneous check with the first group out of these all told 49 men reacted to cutaneous tularin. This comprised 65.2%.

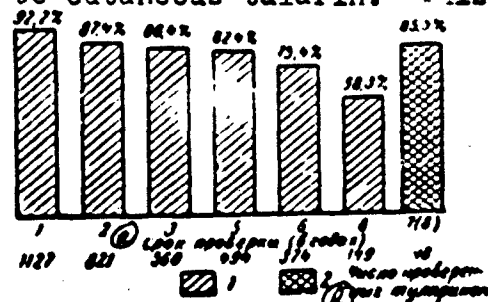


Fig. 1. Dynamics in the lowering of allergic reactivity in vaccinated (1) and revaccinated (2) persons.

Key: (a) Period of check (in years); (b) Number checked with tularin.

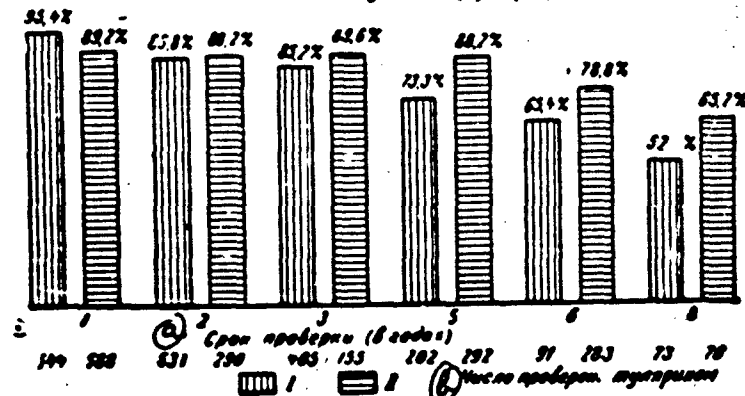


Fig. 2. Comparative data on the fading away of allergic reactivity in children (I) and adults (II). Key: (a) Period of check (in years); (b) Number checked with tularin.

We also noted that the loss of vaccine immunity in children took place more rapidly than in adults, as this can be seen in Fig. 2. A year after vaccination children (school age) reacted to tularin following intracutaneous administration in 95.4% of the cases, and adults - in 89.2% of the cases. Eight years after inoculation a reaction to tularin following cutaneous application was obtained in 52% of the children and youth, and in 65.2% of adults. After 7 years 43.4% of the youth had lost vaccinal immunity, and adults - only 24%.

There is particular interest in the results of an immunity check which was carried out in December 1963. This was performed on 133 persons who had been inoculated in December 1948, that is, 15 years ago. During the course of the 15 years these persons were not subjected to inoculations against tularemia for various reasons. In that part of the territory of the former Serpukhovskiy Rayon where these persons lived the last tularemia epizootic was detected in May 1949 and cases of tularemia were recorded in January 1949. Since then no tularemia epizootics or cases of tularemia among the population were observed.

Out of the 133 persons who were checked by the cutaneous method 15 years after vaccination with the live dry NIIEG tularemia vaccine an allergic reaction was noted in 29, i. e., immunity was preserved in 21.8% of those checked. Out of 96 adults inoculated 26 (27.2%) reacted to tularin, and out of 37 persons of school age a positive reaction to tularin was noted in 3 (8.1%). Consequently in a check after 15 years we detected the same regularity as after 8 years following vaccination, i. e., in persons of school age loss of immunity took place more rapidly than in adults. In this group there were no persons who had had tularemia prior to vaccination. This is testified to by the fact that the inoculation reaction in them proceeded like the primary type and after vaccination no tularemia epizootics were recorded on that territory. Therefore we can consider it reliable that we observed vaccine immunity which was preserved for 15 years and not immunity which was naturally acquired after having had tularemia.

Conclusions

1. With the planned and correct performance of antitularemia inoculations it is possible to achieve a sharp and persistent reduction (down to individual cases) of tularemia incidence in the USSR.
2. After 15 years, immunity to tularemia was revealed in 21.8% persons checked who had been vaccinated with the NIIEG vaccine.
3. Immunity to tularemia among persons who were revaccinated (supervaccinated) a year after their primary vaccination is preserved longer than in persons who had only a single vaccination.
4. Loss (decline) of immunity in persons of school age who were vaccinated takes place considerably more rapidly than in adults.

Literature

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